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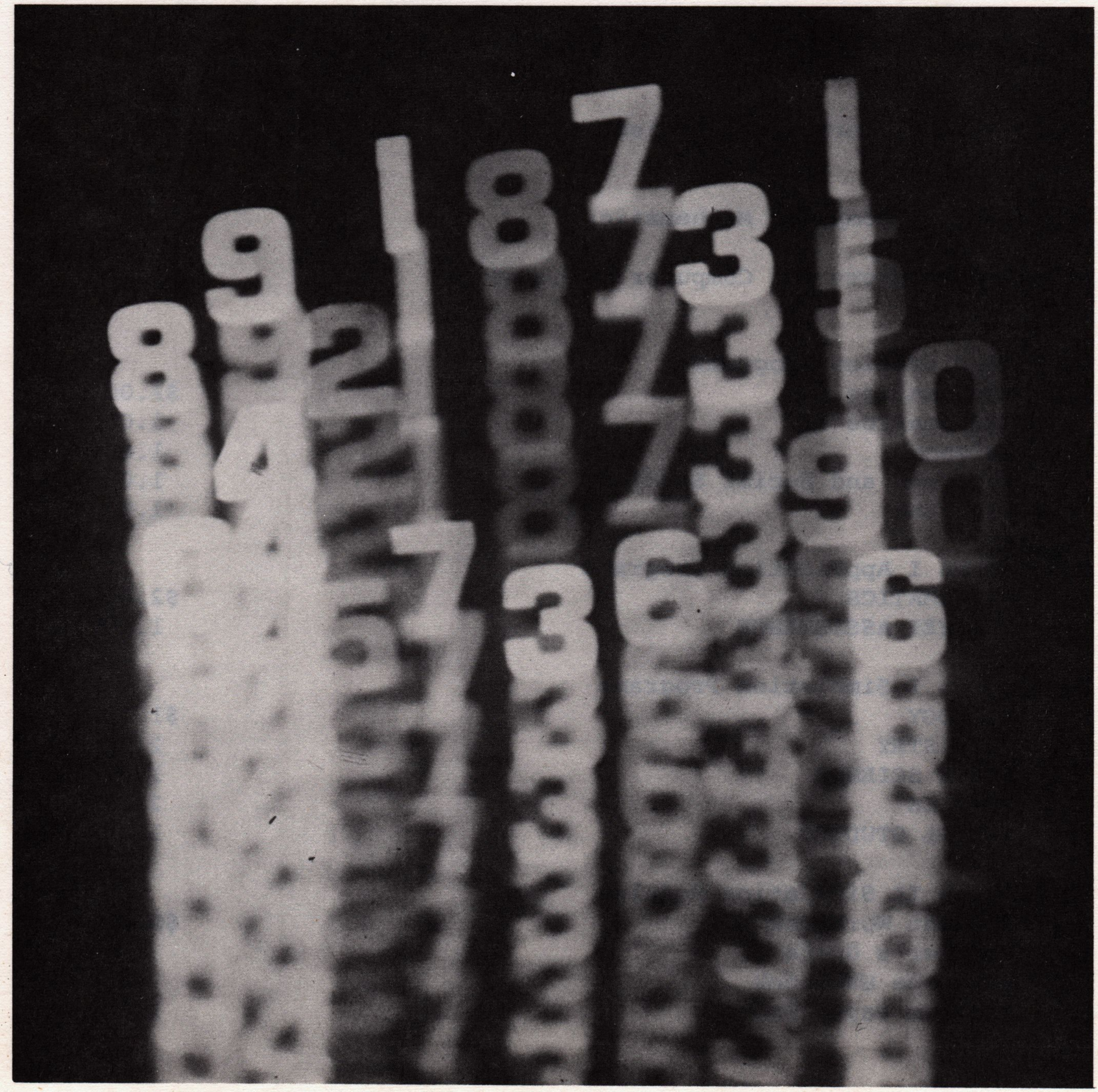

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TEACHER MANUAL

SURVEY ANALYSIS PACKAGE

SAP

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HUNTINGTON TWO COMPUTER PROJECT

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SAP

TEACHER MANUAL

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SAP

TEACHER MANUAL

I. BASIC INFORMATION ABOUT THE *SAP* UNIT

Subject Area:	Social Studies (sociology, psychology, political science)
Specific Topic:	Survey Data Analysis
Grade Level:	10 - 12
Coordinated Computer Program:	SAP
Computer Language:	BASIC
Special Language Features Used:	RESTORE, TAB
Abstract:	**A computer program which performs statistical calculations useful in the examination of large quantities of survey data is used to facilitate a student-conducted survey research project.**

II. DESCRIPTION OF THE PROGRAM

The program in this unit will do statistical calculations useful for examining and analyzing large quantities of survey data. The amount of raw data that the user may enter into the program will depend on the storage capacity of the computer. (Please consult someone familiar with the computer you are using to help you determine the number of respondents you can store data for.) The number of questions that can be stored for each respondent is also dependent on storage capacity. In the rare case where your computer will not accept "0" as a valid subscript, we have included an option in the program to avoid the problem.

After the user has entered the data, he can have the program do any of the following:

1) Compute the mean and standard deviation for any variable. (With OPTIONS 1 through 5 a Recode OPTION is included.)
2) Construct a table of observed frequencies for any two variables, compute chi square, degrees of freedom (df), and allow the user to calculate the correlation coefficient gamma if desired.
3) Construct a table of observed frequencies by row percentages for any two variables.
4) Construct a table of observed frequencies by column percentages for any two variables.
5) Construct a table of expected frequencies for any two variables.
6) Stop the program.

If a minus sign (-) is typed before the option number, the program will use previously stored data to make its calculations. For example, if the user selects OPTION 2, he will be asked to name two variables; then the program will make the calculations and print the results using these variables. If the same two variables are to be used with another option, the user should type " - " and then the option number. This will cause the same two variables to be used in the calculation and will save considerable time by not having the machine re-read the data from data line storage. We suggest that you become familiar with this option, since it will save you time.

Terms Used in the Program

Chi-square: a measure of statistical significance.

Correlation coefficient gamma: a measure of association between two variables.

Expected frequency: number of particular responses that would probably result if there were no differences among the sample population.

Mean: the arithmetic average of a set of values.

Observed frequency: actual number of particular responses.

Range of a variable: the set of possible values the variable could assume.

Standard deviation (S.D.): a measure of the difference between a set of values and the mean of those values.

Variable: a characteristic which can be measured and whose measurement can assume any value within a given range of values. In the context of this unit, each question usually corresponds to a particular variable.

III. NOTES ON RUNNING THE PROGRAM

In order to minimize error and confusion in entering data into the computer, the user should code his survey data onto the form provided in the *STUDENT MANUAL*. These forms help the user organize his data so that it is easy to enter it into the computer. For a complete explanation of how to use the data coding forms and how to enter data into the computer, refer to the *STUDENT MANUAL*.

IV. RATIONALE FOR THE UNIT

The sample survey is one of the most valuable tools used by the social scientist to learn more about the world around him. Americans are constantly being exposed to the results of survey research. The Gallup and Harris polls continually report the popularity of public figures, and advertising bombards individuals with the results of one survey or another. In order to be able to critically evaluate the results of such surveys, or in order to undertake similar studies of one's own, it is necessary for a person to understand the elements of survey design, sampling procedures, and statistical analysis of results. It is also important to have a sense of the nature and limitations of generalizations that are based on sample survey data. One effective means by which students can achieve such an understanding is actual participation in a survey research project from start to finish. This unit is designed to facilitate such an experience, both for the teacher and the student.

Any significant sample survey research involves some statistical analysis of results. Although they are basically simple, these statistical processes can be extremely time-consuming and tedious, especially when the data involves more than two variables. Because this unit utilizes a computer program which performs statistical calculations for large amounts of data, it allows students to do more complex research easily, and minimizes the time and errors that usually would be involved in an analysis of survey data. Once the students are freed from the tedium of doing mind-boggling calculations, they can concentrate their efforts on the more pervasive concepts at which the unit is directed -- survey design, sampling techniques, data accumulation, the process of analysis, and the meaning of results.

In addition, the unit provides a fresh, novel medium for learning. The sample survey can be used at any number of points in the social studies curriculum to enliven and give new dimensions to study. The use of survey techniques can also help students acquire a sensitivity to the thoughts, opinions and attitudes of different groups of people about issues and problems that interest them.

V. SUGGESTED OBJECTIVES FOR THE UNIT

The general objective for the *SAP* unit is to introduce students to a scientific method of inquiry used in social science which requires the researcher to formulate testable hypotheses, frame clear questions, collect and analyze data, and use statistical theory to evaluate results.

After completing a unit which makes use of the materials in the *SAP* package, a student should be able to:

1. Describe the major steps in the survey-research process.

2. Demonstrate an understanding of the survey-research process and its limitations by examining the results of a sample survey and listing questions he would ask about the survey before accepting the results.

3. Given an hypothesis, critique a survey questionnaire to be used in researching the hypothesis with respect to the following questions:

    a) Will the questions asked shed light on the hypothesis?

    b) Will the answers confirm or refute the hypothesis?

    c) Are the questions clear and easy to understand?

    d) If choices of answers are offered, do they allow the respondent to express his true feelings, or do they force him to distort his position?

4. Given a description of a population to be sampled and a sampling strategy, critique the sampling strategy, with respect to the following questions:

    a) Will the strategy produce a truly random sample? If not, what biases will it introduce?

    b) Is the strategy reasonably easy to carry out? If not, what problems are likely to be encountered?

5. Given a survey questionnaire, a description of the sample and sampling procedure, and appropriate computer-calculated tables, write a complete report on the results of the questionnaire.

6. Briefly explain the meaning of the values for chi-square and correlation coefficient as measures of statistical significance.

7. Define the following terms:

    - expected frequency
    - observed frequency
    - range of a variable
    - respondent
    - mean
    - standard deviation

VI. PLAN FOR USING THE UNIT

This section will suggest a plan for using the *SAP* unit. For a detailed, well-written instructor's guide for teaching a unit on survey research, we suggest that you refer to *TESTING FOR TRUTH: A STUDY OF HYPOTHESIS EVALUATION INSTRUCTOR'S GUIDE* (Boston: Allyn and Bacon, Inc., 1969). This booklet was prepared by Sociological Resources for the Social Studies and accompanies a text which is specifically written for the secondary-level student. A combination of the materials in this *SAP* unit and the *TESTING FOR TRUTH* texts provides a complete, self-contained package on survey research enriched by computer usage. This combination of materials is highly recommended as a basis for a unit on survey research.

The *SAP* unit could be introduced in many different contexts. A study of contemporary problems may interest students in determining the degree of political awareness of their fellow students; a study of consumer problems may prompt students to investigate the meaning and validity of advertisements which use survey "attention-getters;" students studying health may want to determine the attitudes of their peers toward drugs, drinking, sex, or smoking. In any case, the students should decide on an area to research which interests them. Once the students are motivated to pursue a unit on survey analysis, you can structure the experience into four fundamental phases: 1) survey design and preparation; 2) data gathering; 3) coding and computer calculations; and 4) data analysis and interpretation. Each of these phases will be discussed in greater detail below.

The first time the project is attempted, you may want to keep the questions, assumptions and hypotheses as simple as possible, so that they do not obscure the method being used.

A. Activities Preparatory to Use of Program

Phase 1: Survey design and preparation

1) Decide on the area to be researched.

2) Discuss the major purposes of a sample survey. Explain that the social scientist uses the sample survey to: a) test an hypothesis he has formulated; or b) collect information about certain characteristics of a selected population. Point out that the second purpose can provide the social scientist with information from which he can derive an hypothesis, or it may simply provide him with data on the population surveyed.

3) Discuss the meaning of hypotheses, how they are formulated, and the characteristics of good hypotheses. Pages 13-16 of the *TESTING FOR TRUTH INSTRUCTOR'S GUIDE*, referenced above, should be of help here.

4) If the survey is to be used to test an hypothesis, develop the hypothesis to be tested. Within the same general area, different groups of students may wish to test different or even contradictory hypotheses. The results of such a strategy could be very interesting, and a good deal of learning about survey analysis may take place, especially if contradictory hypotheses appear to be true. Be certain that students state their hypotheses precisely, that their statements can be tested, and that their hypotheses have been derived with sound logic from plausible premises. Emphasize that, as researchers, the students must try to be as objective as possible; that they should not try to either confirm or deny the hypothesis, but to find out what really *is*.

5) If the survey is to be used to examine characteristics of a population, determine the characteristics to be investigated in the survey. Be sure that the students choose characteristics that are well-defined and measurable.

6) Discuss the characteristics of good questions: how they are formulated, and errors that can creep into questions. The "Survey Research" reprint included in the *RESOURCE MANUAL* of this unit should be of assistance here. Pages 200-205 of this reprint are especially helpful. Also, pages 17-18 of *TESTING FOR TRUTH, INSTRUCTOR'S GUIDE* should be useful.

7) Draw up questions. It might be helpful to have each individual student formulate a set of questions. The students could discuss them in class, and then the various groups could choose the best questions for their questionnaire. It is very important for students to understand that the questions must be clear, and that only one point should be addressed in each question.

8) Pretest the questionnaire to "debug" it. On the basis of the pretest results, students should make any changes or modifications that are necessary in form or content.

9) Determine the sample and the sampling technique. At this point, you will probably want to give an introduction to the probability theory that gives legitimacy to the random sampling technique. The *TESTING FOR TRUTH* student text (pp. 7-13) and the accompanying *INSTRUCTOR'S GUIDE* would be particularly helpful in preparing for this discussion. Other useful resources are listed in the *RESOURCE MANUAL* for this unit. The method of sampling you will use depends on the size of the school or community within which you work. School enrollment lists are invaluable for random sampling. The main thing is to keep the sample manageable and also scientifically accurate. (Remember that the computer program in this unit will accept data for up to 120 respondents.)

If you wish to do so, and have the extra time to spare, you may discuss the stratified sample here, and use such a sample in the surveys. The "Survey Research" reprint in the *RESOURCE MANUAL* of this unit discusses the stratified sample on pages 198-200.

10) Discuss the statistical tests used to interpret results. The mean, standard deviation, chi-square, and gamma values should be treated in this discussion, and students should gain some experience in computing these values for small surveys with a minimal number of variables. A good text presentation of these notions can be found in *TESTING FOR TRUTH*, pages 16-23, and the *STUDENT MANUAL* for this unit, pages 9-16. Several related exercises are provided in Exercise Set 3 in the *RESOURCE MANUAL* for this unit. If you are able to do so, it may be helpful to arrange for this discussion to take place in the context of a mathematics class. The students should understand how and why these tests of statistical significance are done and what they mean.

Phase 2: Data gathering

1) Rehearse interview techniques. If the interview technique is to be used, students should practice administering the questionnaire. They should be aware of the ways in which an interviewer can bias a question, and should learn to be as objective as possible in administering the questionnaire.

2) Collect the data. A clear plan for collecting the data should be drawn up. Samples should be assigned to students, locations for interviews or distribution of questionnaires should be determined, and strategies should be set up for what to do if selected respondents are absent.

B. Use of *SAP* Program

Phase 3: Coding and entry of data

1) Record survey data on data coding form. These forms (and directions for their use) are supplied in the *STUDENT MANUAL* and are designed to minimize confusion on the part of students when they enter the data on the computer.

2) Transfer data to machine-readable medium. A paper tape should be cut (or mark-sense cards completed, if appropriate) for the data lines. The program has been designed to store data in lines 1500 through 1900. It may be advisable for students to work in pairs, one reading the entries and the other typing, in order to minimize error.

3) Determine the information needed from the computer; that is, decide for which variables the mean and standard deviation should be calculated, which pairs of variables should be cross-tabulated, etc.

4) Run the *SAP* program and obtain the data needed.

C. Follow-up Activities

Phase 4: Data analysis

1) Examine the computer-generated data. In order to make the data clear, students should first label the tables that were generated. Directions for labelling can be found in the *STUDENT MANUAL* . Some students may want to use the computer again to get some expected frequency tables to help them understand the derivation of the chi-square.

2) Discuss ways of reporting findings. You may want to treat such topics as conclusions and generalizations and the difference between a correlation and a causal relationship. If time permits and the class is able, you may want to include a discussion of control variables here. If so, students could use their data coding forms to select data for subtables, and this new data could be fed into the computer for analysis.

3) Write a research report summarizing work and results. Each student should write a complete report on the survey research experience. The following is one possibility for a general outline that could be used for the paper. Specifics should be provided by you so students know exactly what to include.

I. The Statement and Derivation of the Hypothesis and Tentative Conclusions (or Description of the Characteristics about which Data is to be Gathered)

II. The Questionnaire

III. A Description of the Sample and Sampling Technique

IV. Computer-Generated Tables

V. Interpretation of Findings

VII. INTRODUCTION TO THE *STUDENT MANUAL*

The *STUDENT MANUAL* for *SAP* provides the student with an introduction to the unit, a detailed description of the *SAP* program, and complete instructions for preparing survey data for the computer. It includes an extensive section entitled "ALL ABOUT THE *SAP* PROGRAM." This section thoroughly explains each option of the *SAP* program, gives an example for each option, and explains how to label and interpret the computer printouts. The *STUDENT MANUAL* also contains several blank data coding forms.

No exercise sets have been included in the *STUDENT MANUAL*. Rather, the exercise sets have been placed in the *RESOURCE MANUAL* to allow you to use them more easily at your own discretion. Each exercise set in the *RESOURCE MANUAL* relates specifically to a particular topic in survey research. Since most of the resources we have suggested do not include exercises, the exercises provided in the *RESOURCE MANUAL* will probably be helpful for checking understanding as the unit progresses. A substantial sample survey has also been included in the *RESOURCE MANUAL*. This could be used for practice with the procedures involved in running the computer, or as the basis for a unit test.